UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,934	11/19/2001	Christopher J. Orlick	MATP-613US	9363

23122	7590	08/25/2005		

RATNERPRESTIA
P O BOX 980
VALLEY FORGE, PA 19482-0980

EXAMINER
TRAN, TRANG U

ART UNIT	PAPER NUMBER
2614	

DATE MAILED: 08/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-30* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1,15,29 and 30* is/are rejected.

7) ☒ Claim(s) *2-14 and 16-28* is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>04 January 2002</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/19/01</u>

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2.   Claims 29-30 are rejected under 35 U.S.C. 101 because they are directed to

recording medium storing nonfunctional descriptive material. Data structures not

claimed as embodied in computer-readable media are descriptive material per se and

are not statutory because they are neither physical "things" nor statutory processes.

See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure

per se held nonstatutory). Merely claiming nonfunctional descriptive material stored in a

computer-readable medium does not make it statutory (see MPEP 2106. IV. B. 1).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1, 15 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Shin et al. (US Patent No. 6,396,543 B1) in view of Acharya et al (US Patent No.

6,229,578 B1).

In considering claim 1, Shin et al discloses all the claimed subject matter, note 1)

the claimed if the target pixel location is an edge pixel location, comparing the first and

second gradient intensity values to determine an approximate angle for the edge is met

by the edge direction detection (minimum value) (Fig. 2, col. 2, line 55 to col. 4, line 40),

and 2) the claimed if the target pixel location is an edge pixel location, interpolating a

value for the target pixel location from the values of pixels in the interlace scan image

adjacent to the target pixel and lying along the determined approximate angle is met by

the intra-field interpolation (col. 2, lines 55-63 and col. 4, lines 38-58).

However, Shin et al explicitly do not disclose the claimed determining a first

gradient intensity value in a first direction in a predetermined region about the target

pixel position and a first magnitude value for the determined first gradient intensity

value, determining a second gradient intensity value in a second direction in the

predetermined region about the target pixel position, the second direction being different

from the first direction, and a second magnitude value for the determined second

gradient intensity value, and determining if at least one of the first magnitude value and

the second magnitude value exceeds a predetermined threshold to define the target

pixel location as an edge pixel location.

Acharya et al teach that once the localization region is defined, the next step is to

determine the gradient value associated with each and every pixel in the localization

region by applying some mask or operator (step 120), this mask or gradient operator is

applied to a small neighborhood above each pixel, ordinarily with that neighborhood as

well being of smaller size than the localization region...whatever the selected threshold

value, the gradient (or normalized gradient) is compared against that threshold value

(step 140), if the gradient (or normalized gradient) exceeds the threshold value, the

corresponding pixel can be classified as an "edge" pixel which is a pixel that belongs to

a edge feature of the image such as a line, if not, the pixel is classified as a non-edge

pixel... and the gradient operation is used in edge detection since it is assumed that an

edge has a particular direction within the image space, the pixels along the side

boundary (one side-I0, I3, I6 and another side-I2, I5, I8) of the pixel should have a

strength or relative combined intensity level less than the pixel I4 itself if I4 is to be

considered an edge pixel, the image space is in two dimension, vertical and horizontal,

two direction differential about the pixel I4 need be computed (Figs. 1 and 2, col. 4, line

27 to col. 7, line 60).

Therefore, it would have been obvious to one ordinary skill in the art at the time

of the invention to incorporate the gradient-based edge detection as taught by Acharya

et al into Shin et al' s system in order to accurately classifying the pixels of the video

image as either edge pixels or non-edge pixels.

Claim 15 is rejected for the same reason as discussed in claim 1.

Claim 29 is rejected for the same reason as discussed in claim 1.

Allowable Subject Matter

5.   Claims 2-14, 16-28 are objected to as being dependent upon a rejected base

claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

Each dependent claims 2, 11, 16 and 26 identifies the uniquely distinct features:

"calculating a difference value between the larger magnitude value and the other

magnitude value; representing as bit strings said first and second magnitude values and

the difference value; identifying a most significant non-zero bit position in the bit string representing the larger magnitude value; identifying a bit position in the bit string representing the difference value, the identified bit position corresponding to the bit position identified in the bit string representing the larger gradient intensity value; dividing a binary value at the identified bit position in the bit string representing the difference between said first and second gradient intensity values, and a predetermined number of less significant bit positions, by respective increasing powers of two to produce respective results, and summing the results to produce a sum; subtracting the sum from unity to generate a tangent value" . The prior art, either singularly or in combination, fail to anticipate or render the above underlined limitations obvious.

Each dependent claims 7 and 21 identifies the uniquely distinct features: "representing as bit strings said first and second magnitude values and the difference between said first and magnitude values; identifying a most significant non-zero bit position in the bit string representing the larger magnitude value; identifying a bit position in the bit string representing the difference between said first and second magnitude values, the identified bit position corresponding to the bit position identified in the bit string representing the larger magnitude value; selecting one coefficient set from among a plurality of coefficient sets responsive to the larger magnitude value, each coefficient set including a plurality of coefficient values; multiplying each one-bit value corresponding to the identified bit position in the bit string representing the difference between said first and second magnitude values, and a predetermined number of less significant bit positions, by respectively different ones of the coefficient values in the

selected coefficient set to produce a plurality of results, and summing the plurality of results to determine the angle of the edge". The prior art, either singularly or in combination, fail to anticipate or render the above underlined limitations obvious.

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Silver et al. (US Patent No. 6,408,109) disclose apparatus and method for detecting and sub-pixel location of edges in a digital image.

Sobel et al. (US Patent No. 6,707,937 B1) disclose interpolation of edge portions of a digital image.

Lim et al. (US Patent No. 6,614,484 B1) disclose deinterlacing method for video signals based on edge-directional interpolation.

Itoh (US Patent No. 6,810,156 B1) discloses image interpolation device.

7.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trang U. Tran whose telephone number is (571) 272-7358. The examiner can normally be reached on 8:00 AM - 5:30 PM, Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John W. Miller can be reached on (571) 272-7353. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

TT TT

August 18, 2005

JOHN MILLER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600